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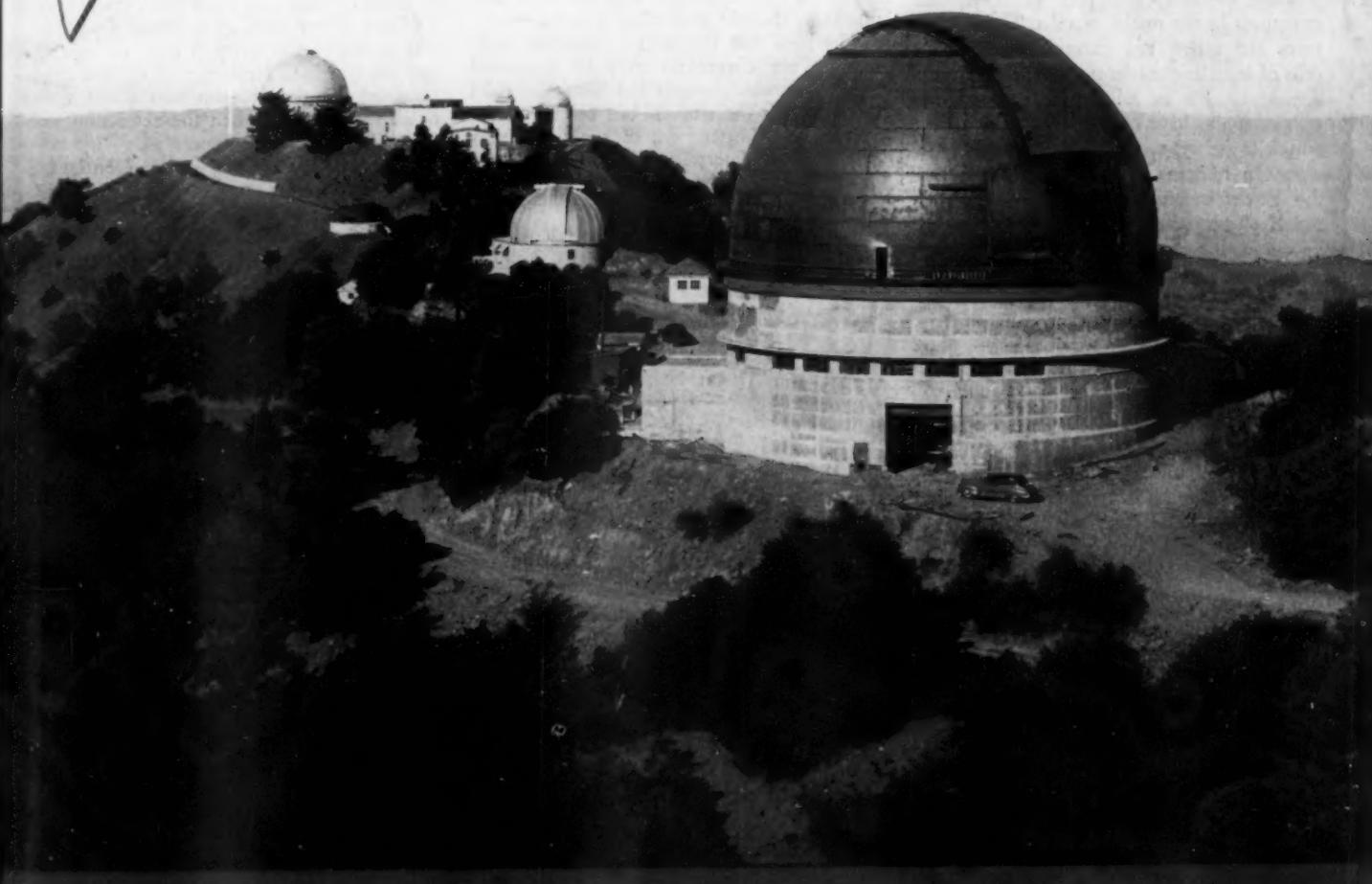
TECHNOLOGY DEPT.

APRIL 19, 1952

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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DETROIT



Heavenly Eyes

See Page 250

A SCIENCE SERVICE PUBLICATION



VOL. 61 NO. 16 PAGES 241-256

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TECHNOLOGY DEPT.

GENETICS

Sex Shows in Human Cells

For cases where true sex of child is difficult to determine, microscopic examination of skin cells would show treatment needed.

► THE NERVES and all tissues of the body show sex differences. And in cases where, because of abnormal pre-birth development, the true sex of an individual is in doubt, microscopic examination of a small piece of skin will probably yield up the answer.

These findings are from studies by the following scientists at the University of Western Ontario, London, Ont.: Dr. M. L. Barr, E. G. Bartram, Mrs. Margaret Graham, Miss Yvonne Ferguson, Keith Moore, Hugh Lindsay and Dr. Raymond Prince.

The sex of an individual is determined initially by a special pair of thread-like structures in the nuclei of cells. These structures are called sex chromosomes. Tissue cells of females contain two of these chromosomes, known as X chromosomes. Tissue cells of males have only one X chromosome which is paired with an unlike Y chromosome. In humans and many other animals the Y chromosome is much smaller than the X chromosome.

CHEMISTRY

Clothed in Oil and Gas

► NATURAL GAS and petroleum may clothe earth's 2,400,000,000 inhabitants, in the opinion of Dr. Gustav Egloff, director of research, Universal Oil Products Co., Chicago.

At the rate of three pounds of clothing, on the average, per person, each of these 2,400,000,000 persons could have a new suit each year made of fibers of constant quality, at the expense of less than 2% by weight of the natural gas and crude oil produced that year, by Dr. Egloff's calculations.

Petroleum chemicals constitute our greatest and most accessible source of chemical raw materials, Dr. Egloff continued, for they are a by-product of the expanding oil industry, which is increasing production each year. This is in contrast to coal-tar, former sole source of aromatic chemicals.

Coal-tar chemicals come on the market largely by the way of the coke refined for the steel industry. Less than 10%, according to Dr. Egloff's calculations, is added to the quantity of coal-tar chemicals yearly, while use of petrochemicals comes nearer to doubling each year.

From petrochemicals comes an ever increasing number of new fibers. The synthetic textiles made from them are an improvement over those which have been ob-

Discovery that the two X chromosomes could be seen in the nuclei of nerve cells of females was made in studies of cats. The small body formed by the X chromosomes, called the sex chromatin, was seen in the cell nucleus. In the nerve cell nuclei of male cats, it seldom is large enough to be seen, partly because of the small size of the Y chromosome.

The findings on cat nerve cells, made in 1948 by Dr. Barr and Mr. Bartram, were extended by Mrs. Graham and associates to many other animal species and cells of other tissues, including skin, muscle, cartilage, the lining of the stomach and kidneys, and pituitary, thyroid and other glands.

The idea that the special substance making up sex chromatin may be connected with cancerous changes has been the chief incentive for the studies. But for those rare cases when the true sex of a child is very difficult to determine, finding the sex chromosomes in the skin cells is expected to give an important step prior to treatment.

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tained from nature for so many years. Natural fibers are never constant in quality.

Both wool and fur are affected by the health and condition of the animal which produced them. The health of the animal, in turn, depends on the food supply, which depends on climate and the soil in which the animal's fodder is grown, and on the chemicals in the soil. Each of these factors is subject to change. Changing conditions make a lack of uniformity which chemists find disconcerting.

Artificial fibers, on the contrary, are made under exact conditions. These can be controlled to produce just the effect wanted. Trousers made of artificial fiber textiles can hold the crease which was set in the molecules when the fiber was designed.

Yet the same fabric can be crease-resistant when that is desirable, can be washed without shrinking or wrinkling, and needs no ironing.

Artificial fibers can be made up into a great variety of materials. Dr. Egloff looks forward to clothing the earth's billions of future population with the same chemical source materials modified to suit the climate of the part of the world where each user happens to live.

Fur coats will be formed from petro-

chemicals for those who live in cold regions. Diaphanous materials will make cool clothes for those who live in the tropics. For especially hot climates, Dr. Egloff foresees materials treated with reflecting surfaces for a one-way view.

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NUTRITION

Eggs and Meat Contain More B-12 Than Was Believed

► THERE IS more vitamin B-12, the chemical that combats pernicious anemia, in the eggs and meat you eat than was previously believed.

A new method of extracting vitamin B-12 from eggs and meat was described by C. A. Denton of the U. S. Department of Agriculture, Beltsville, Md. The process, using sodium cyanide, a very powerful poison, is based on experiments conducted in collaboration with W. L. Kellogg and Dr. H. R. Bird, he told the American Institute of Nutrition meeting in New York.

When a very small quantity of the poison was added to the solution used for extracting vitamin B-12 from egg yolks, the value obtained for the vitamin was about three times higher than when the extraction was done in the usual manner.

One explanation for this, Mr. Denton believes, may be that the 4% cyanide contained in B-12 itself is lost during the extraction process, and this changes the B-12 into another chemical which is not as stable, and therefore the low value for the vitamin is obtained. The added cyanide apparently prevents the B-12 from changing into the other form. The scientists checked their new method by extracting yolks to which a known quantity of the vitamin had been added. When the extra cyanide had not been added, their results were low.

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GENERAL SCIENCE

Science Foundation Gives 624 Fellowships

► AMONG THE 624 graduate science fellowships just awarded by the National Science Foundation, 29 went to winners of the national Science Talent Searches for the Westinghouse Scholarships of past years.

Since only 40 winners in this SCIENCE SERVICE competition open to secondary school seniors are picked each year, this is a high proportion.

Awarded for the first time for use in the 1952-53 academic year, the National Science Foundation fellowships are for full-time study for advanced degrees. About 3,000 applied in all fields of science and from all parts of the United States and possessions.

Biological sciences, chemistry and physics each received about a quarter of the fellowships, with agriculture, anthropology, astronomy, engineering, earth sciences, and mathematics accounting for the remainder.

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ASTRONOMY

Clue to Sun's Heat

Simultaneous observations of sun's outer envelope with both radio and optical telescopes may yield information on its temperature.

► A CLUE to the temperature of the various layers of the sun's envelope may lie in a series of pictures taken at Khartoum, Anglo-Egyptian Sudan, during the total solar eclipse of Feb. 25.

These pictures, just developed and enlarged, may be the connecting link between optical observations of the sun and studies conducted with radio equipment. Dr. Walter Orr Roberts, superintendent of the High Altitude Observatory, Boulder, Colo., told SCIENCE SERVICE.

Astronomers using radio telescopes to listen to hisses from the sun and those minutely examining the rainbow colors of the sun's spectra have gotten conflicting figures for the temperature of the sun's outer atmosphere.

Studies with radio telescopes indicate that the lower chromosphere, situated just above the intensely brilliant visible surface of the sun, is relatively cool. But from there out to the tenuous corona, pale envelope of the sun visible only during a solar eclipse, the temperature rises rapidly, radio astronomers be-

lieve. Optical data, on the other hand, show great heat deep within the chromosphere, where the temperature apparently reaches about 30,000 degrees Centigrade.

During the recent total eclipse, which lasted a little over three minutes at Khartoum, simultaneous observations of the sun's outer envelope were made with radio telescopes and with the more traditional optical telescopes. This expedition, organized by the Naval Research Laboratory, was led by Dr. Edward O. Hulbert.

Spectra of different layers of the sun's outer envelope were snapped in a fraction of a second during the eclipse by a group working under the direction of Dr. J. W. Evans of the High Altitude Observatory. It is the hydrogen lines in the ultraviolet part of the spectrum that are expected to reveal more exactly than ever before the temperature of the corona.

Taken at the beginning and end of the eclipse, these pictures of the "flash spectrum" show bands of light produced by the sun's outer envelope. In addition to the familiar

red and blue lines due to intensely hot hydrogen gases, these spectra pictures show about 35 other ultraviolet hydrogen lines. Although most of these lines have been observed before, the Boulder astronomers believe desired details are shown more clearly in these pictures than previously.

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ARCHAEOLOGY

Text on Bronze Scroll New Treasure from Cave

► NEW TREASURE has been unearthed from the rich archaeological "mines" in the caves along the banks of the Dead Sea, Prof. A. Henry Detweiler of Cornell University reported in Ithaca, N. Y.

This time the find is an ancient manuscript engraved in square Hebrew letters on a pair of tightly rolled bronze sheets. No one yet knows what literary gem was thus preserved in lasting metal, but it was in this same area that archaeologists found a parchment scroll with a Hebrew text of the Book of Isaiah and other early Biblical manuscripts.

These rich finds and the discovery by Bedouins of other manuscript fragments in a nearby cave encouraged scientists to organize an expedition to search all the caves in the area. Forty have now been located and explored.

The problem of cleaning and unrolling the eight feet of bronze sheet is an extremely delicate one. Archaeologists have found that metal, especially copper and bronze, that has laid in the ground for a long time crystallizes and becomes very brittle. Any attempt to lay it out flat is likely to cause it to crumble into small bits. Usually neither heat nor chemicals will restore the metal to its original pliable state.

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MEDICINE

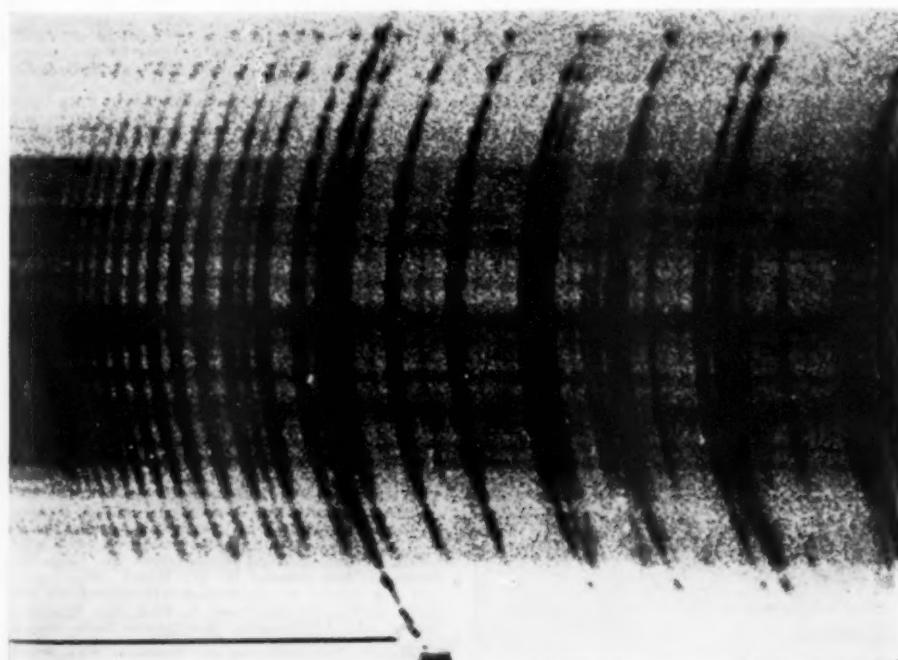
Blue Dye With Cancer Affinity Aids X-raying

► A BLUE dye with an affinity for tumor tissue may make X-ray treatment of cancer more effective, Dr. John H. Heller of Yale University School of Medicine reported at the meeting of the International Association of Medical Museums in New York.

The dye is called isamine blue, or, chemically, naphthylpararosaniline. When injected into the blood stream, the dye seeks out the tumor, staining it blue. And the dye in the tumor or cancer seems to make it more susceptible to X-ray destruction.

So far, Dr. Heller has not tried the blue dye treatment in human patients because he has not been able to get a pure form of the dye. But in rats the dye seems to help. Tumors with dye stain were considerably smaller after X-ray treatment than tumors given the same X-ray dosage without blue staining first.

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HYDROGEN LINES—Those underlined are in the ultraviolet part of the flash spectrum and are due to hydrogen in the sun's outer envelope. They were photographed at Khartoum, Anglo-Egyptian Sudan, during the recent total solar eclipse by Dr. J. W. Evans of the High Altitude Observatory at Boulder, Colo.

PUBLIC HEALTH

Keep Fit to Work After 65

► MORE THAN three-fourths of American men want to keep on working after age 65, a survey by the Northwestern National Life Insurance Company at Minneapolis shows.

To help these men keep themselves more valuable, instead of less, the insurance company gives six common-sense rules based on the advice of experienced employment agency men and business personnel managers. The rules could apply as well to women who want to go on working into their sixties and seventies. Here they are:

1. Keep your mind always in training, active and open to new ideas. In this way you can keep your mind 10 years younger than your calendar age, and avoid "rust" and senility. There is universal agreement among the employment experts consulted that "Some men are mentally young, adaptable, and therefore valuable at 70; others are old and in a rut and ready for the shelf by 55 or 60."

2. Have a specialty, stay with it and always keep learning more about it. Employment agency people say, "An older man with 20 years or more of experience in one field is far easier to place than one who has shifted around, with maybe five years in sales, four in credit, half-a-dozen years in accounting, etc."

3. Build the widest possible range of personal contacts as you grow older. Be active in a professional club if there is one in your line, in a luncheon club, trade association, etc.; keep active in community work and church work. Entirely aside from the joys of being of service to your fellows, a wide field of contacts will make it far easier for you to locate a new and satisfactory situation, should the need come.

4. Watch your own little personality "kinks," your irritability, prejudices, jealousies, sensitiveness to criticism, etc. As

you get older they can develop into fatal handicaps to employment.

5. Watch your health habits during youth and middle age, that you may still be healthy at 60 and 70. Have a thorough physical checkup every year. Personnel managers agree that the slight slow-down usually noticeable in the worker of 60 is not a problem, but that the increasing frequency of complete work interruptions due to illness and actual breakdowns among older workers is a major difficulty in their employment.

6. Watch your personal appearance. There is a strong tendency among older workers, both men and women, to get a bit careless, even sloppy, in their dress and grooming. This usually indicates a letdown in the care they give the details of their work and it tends to mark such workers as on the downgrade and overdue for retirement, even at 55 or 60. It makes them especially difficult to place in new employment.

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MEDICINE

50% Cancer Patients Live with Adrenals Removed

► MORE THAN 50% of advanced cancer patients who have had the vital hormone-producing adrenal glands removed are now living healthy, normal lives, according to Dr. Charles B. Huggins, University of Chicago surgeon. One of them is even back at his work as a boiler-maker.

Dr. Higgins reported that he has operated on 42 patients with prostate or breast cancer. Of these, only the third and fourth are dead. Since the first prostate operation, 13 months have passed, while 11 have passed since the first breast cancer operation.

The recovery in half of these patients is remarkable. From severe pain and wasting away, Dr. Huggins said, they go, within a very few days after operation, to happy, healthy specimens. Those who thus recover, he believes, have cancers which are dependent for their existence on the hormones secreted by the body's glands. The other half have cancers which are not. At the present time, there is no way of telling which cancers are hormone-dependent before operation.

The patients, after operation, get cortisone daily to replace the adrenal secretion.

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SCIENCE NEWS LETTER

VOL. 61 APRIL 19, 1952 No. 16

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc. 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs. \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, S. 2-4822.

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The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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Question Box

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How was it shown for the first time that chickens can make their own cystine? p. 251.

CHEMISTRY

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GENERAL SCIENCE

Who has just been elected Secretary of the Smithsonian Institution? p. 246.

What was the Navy's Project Sneeze? p. 249.

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MEDICINE

What chemical has been effective in birth control of rats? p. 252.

NUTRITION

What wild greens can safely be eaten? p. 248.

PSYCHOLOGY

How should big league ball players be rated? p. 255.

SEISMOLOGY

How many earthquakes have rocked Oklahoma in the last 34 years? p. 247.

BOTANY

Plants Grow in Red Light

Plants, grown in dark for as long as three weeks on their own stored food, are normal appearing, but are yellowish in color and have no green.

► PLANTS THAT are perfectly normal-looking except for their color will grow without light. The dark-grown plants are yellowish, with no green at all to be seen. When they are put into light, however, they turn green.

Tiny plants have been grown for as long as three weeks without light, Dr. Robert B. Withrow of the Smithsonian Institution reported to the Botanical Society of Washington. Usually young plants, when without visible light, grow long and spindly, the young tendrils stretching out in a vain effort to reach light.

The yellowish, but otherwise normal-appearing plants, were grown in light that is on the far edge of visible red and in the near infra-red.

Scientists have been studying the effect of light on seedlings for a long time and they have known five separate processes were involved:

1. Photosynthesis, whereby the plant cells change carbon dioxide and water into sugar, a reaction that can occur only when chlorophyll is present and in light. All forms of life, animal as well as plant, are absolutely dependent on this process for all their food, either directly or indirectly.

2. Formation of chlorophyll, the complex chemical compound somewhat resembling blood in its structure but with magnesium instead of iron, responsible for the green color of plants and an important factor in photosynthesis.

3. Phototropism, which involves the bending of plants toward a window.

4. Photoperiodism, by which light, through the factor of day length, controls the time of flowering of many plants. It is largely responsible for the separation of many wild flowers into spring, summer and fall blooming classes.

5. Photomaturation, the process Dr. Withrow and associates have brought about using far red radiation. This reaction causes the leaves of young seedlings to expand. It also causes increased cell wall development and the disappearance of the hook or arch that appears in the stem as seedlings come through the ground.

Until now, however, scientists have not been able to separate the growth and development reactions involved in phototropism, photoperiodism and photomaturation from the chlorophyll and photosynthesis processes. Using barely visible light in the far red as well as infra-red, they can study the biochemistry of plant growth while the food stored by the seedling for its first two or three weeks' growth lasts. Since no visible

light is present, chlorophyll does not develop nor does photosynthesis take place, but growth and development do occur as long as the seed's own food reserves remain.

Dr. Withrow's experiments, mainly on young bean plants, were performed in the reorganized radiation laboratory at the Smithsonian Institution. They are part of a planned program to learn more about the exact mechanism by which the green plant turns sunlight's energy into the food which we eat.

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ASTRONOMY

Faint Nova Found By Mexican Astronomer

► ANOTHER STAR has blazed forth in the southern sky. Much too faint to be seen without a good telescope, this 12th magnitude nova is in the constellation of Sagittarius, the archer.

Like another "new star" found in Sagittarius last February, this nova was dis-

covered by Dr. Guillermo Haro, director of Mexico's National Astrophysical Observatory at Tonanzintla, Puebla. Dr. Haro reports that the flare-up of the star, which caused it to increase several hundred times in brightness, possibly occurred before Feb. 21 as it appears on photographic plates taken that long ago. Photographs of that area of the heavens made last year, however, fail to show the star, even though 18th magnitude stars were "caught" by the Schmidt camera.

News of Dr. Haro's discovery—the third nova he has found this year—has just reached Harvard College Observatory, Cambridge, Mass., clearing house for astronomical information in the western hemisphere.

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ICHTHYOLOGY

Blood Groups Track Fish in Sea Wandering

► FISH HAVE blood groups, too. In tuna fish blood there is an antigen similar to that in human Group A blood. This and other findings, reported by Dr. John E. Cushing of the Santa Barbara College of the University of California, result from studies made to see whether separate breeding populations within single species of fish could be readily distinguished. The movements of fish populations in the sea might also be followed by blood tests, Dr. Cushing suggests in his report to the journal *SCIENCE* (April 11).

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SCIENCE AMPHITHEATER—One of the two large lecture rooms in Harvard's new Allston Burr Lecture Hall where classes started this week. The building is designed and especially equipped for showing scientific experiments to students who are studying as laymen, not as future scientists.

MEDICINE

Reprieves But No Cures

Victims of leukemia, Hodgkin's disease and lymphosarcoma can be treated with chemicals, but sooner or later they develop resistance.

By JANE STAFFORD

(Fourth in a series of five articles on what can be done about cancer)

► FOR THE unfortunate victims of one group of cancerous diseases, reprieve rather than cure is the rule. This group includes the so-called blood cancers, or leukemias, Hodgkin's disease and lymphosarcoma.

Lymphosarcoma in most cases affects the lymph nodes, or glands, in the chest, or the tonsils and lymph nodes in the neck. These spots of abnormal growth do not spread until late in their course, so the condition can be cured if treated before it has become generalized.

Somewhat like lymphosarcoma is Hodgkin's disease. A painless swelling of the lymph nodes, or gland, in the neck is usually the first symptom. Intractable itching and bouts of fever come next. Then the patient feels tired and listless, loses weight, becomes anemic and has pains in his bones. The patient with Hodgkin's disease will have periods when he feels better and seems to be quite well. This is called a remission, and it may come whether he has had treatment or not. The average length of life in this disease is about three years. But about seven per cent of patients who have been treated are alive 10 to 15 years after the symptoms started. In a few rare cases, the patients have lived 25 years. The facts that remissions, both natural and after treatment, may last a long time and that some patients may continue to relapse and get better over a period of years makes it difficult to determine whether or not any Hodgkin's disease patient has been cured.

The leukemias, sometimes called blood cancers, are of two main types. One is called myeloid leukemia. In this, there is an increase in the number of a special kind of white blood cells. These white blood cells are called granulocytes. This kind of leukemia involves the bone marrow and spleen primarily, the lymphoid tissue secondarily.

In lymphoid leukemia, on the other hand, both lymphoid tissue and bone marrow seem to be involved at the same time, though the main changes may be in the spleen and lymph nodes. In this type of leukemia, it is the lymphocytes of the white blood cells that are affected.

An acute form of leukemia attacks young children from about two to five years old especially. This is a swift killer, death coming usually in a few months. High fever, multiple hemorrhages and rapid wasting

are the symptoms during the short course of this disease.

Young adults in their 20's are the chief victims of myeloid leukemia and Hodgkin's disease. These two are twice as common in men as in women. Lymphoid leukemia comes later in life, attacking chiefly the 40- to 60-year-olds. This kind of leukemia is three times as common in men as in women.

As with Hodgkin's disease, the first symptom of lymphoid leukemia is often a moderate, painless enlargement or swelling of the lymph nodes in the neck. In myeloid leukemia, on the other hand, the first symptom is an enlargement of the spleen which causes a dragging sensation, abdominal distension, or attacks of acute pain in the region of the spleen. Loss of weight and energy, breathlessness and pale color develop because of the anemia that goes with this leukemia.

For all these diseases, the main treatment is radiation. The treatment does not cure,

but produces remissions of varying lengths. In recent years, a battery of chemicals has been added to radiation treatment of these diseases. One of the first was a combined chemical-radiation treatment, radioactive phosphorus which could be taken by mouth. Spleen, bone marrow and other spots affected by these diseases concentrate several times the amount of phosphorus that other body tissues take up. Consequently the radioactive phosphorus is one way of getting more radiation to the diseased tissues in leukemia.

Still newer in the fight against leukemia and Hodgkin's disease are urethane, the nitrogen mustards, anti-folic acid chemicals, and the hormones, ACTH and cortisone, which first sprang into fame as arthritis remedies.

For some patients these different chemicals are used in series together with radiation. When one no longer produces a remission, or makes the patient sick as sometimes happens, another is used until it, in its turn, no longer benefits the patient.

Most interest at present seems to center on the folic acid antagonists, or "anti-folics" as they are called. These chemicals are keeping alive children with acute leukemia who ordinarily die within a few months. Survivals of two and three years instead of a few months have been reported in a few cases. When cortisone or ATCH is added to the anti-folic acid chemical treatment, some children survive even longer than when treated with the anti-folic alone.

But none of these treatments can be called a cure. This is apparent from reports at the Second National Cancer Conference. The reason given is that the leukemic cell has or develops resistance to the chemicals.

About one-third of all patients with acute leukemia are resistant to the chemicals from the very beginning. The others acquire resistance sooner or later. Summing up experience since 1948 with these chemicals, one authority, Dr. Sidney Farber, of Children's Hospital, Boston, said:

"If the problem of resistance, either initial or acquired, of the leukemic cell to the folic acid antagonist could be solved, the usefulness of the antagonists in acute leukemia could be compared with justice to that of insulin in diabetes."

Next Week: Forecast for 1975.

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GENERAL SCIENCE

Dr. Carmichael Elected Secretary of Smithsonian

► THE ELECTION of Dr. Leonard Carmichael as the new Secretary of the Smithsonian Institution of Washington, D. C., has been announced by Fred M. Vinson, Chief Justice of the United States and Chancellor of the Institution. Dr. Carmichael, a nationally-known figure in education and science, is now president of Tufts College in Medford and Boston, Mass.

NEW SMITHSONIAN SECRETARY—Dr. Leonard Carmichael, president of Tufts College, Medford and Boston, Mass., will take over his new duties as secretary of the Smithsonian Institution in January, 1953, following the retirement of Dr. Alexander Wetmore.



Dr. Carmichael will become the seventh Secretary of the Smithsonian Institution when he takes over his new duties in January 1953. He succeeds Dr. Alexander Wetmore, who reached the age of retirement in June 1951.

Dr. Wetmore, a distinguished ornithologist, desires to give his full time to his scientific reasearches, but consented to serve until his successor could be elected and assume the duties of the position.

In 1938 Dr. Carmichael was unanimously elected president of Tufts College by its Board of Trustees. During his administration, he continued his research work in the field of sensory psychology and physiology and has published books in this field.

He is a member of the National Academy of Sciences, the American Philosophical Society, former president of the American Psychological Association, former chairman of the American Council on Education, and belongs to numerous other professional and scientific societies in this country and abroad.

During the second World War, Dr. Carmichael was director of the National Roster of Scientific and Specialized Personnel. This agency listed and mobilized the nation's scientific workers for the war effort. He is now a member of the Naval Research Advisory Committee and of advisory committees to the Research and Development Board of the Office of the Secretary of Defense and to the Veterans Administration.

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SEISMOLOGY

Oklahoma Center for Mild "Unusual" Earthquake

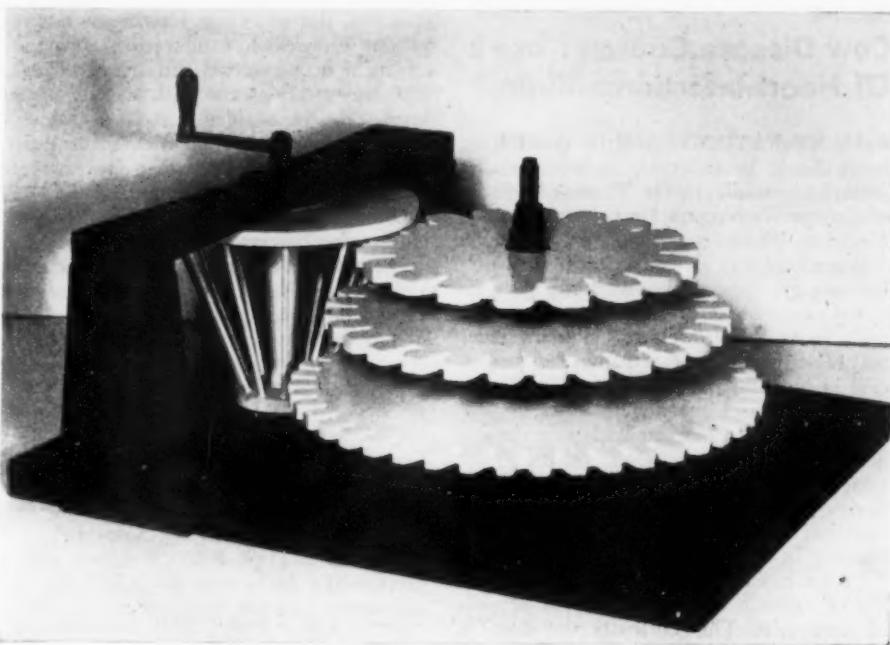
THE EARTHQUAKE that shook six southwestern states Wednesday (April 9) was "very unusual," seismologists at the U. S. Coast and Geodetic Survey said in Washington. Reports from the delicately balanced instruments that record earth tremors were received from all over the country. Seismologists pinpointed the earthquake's epicenter 35.5N and 98W.

This is close to El Reno, Okla., and was also near the epicenter for the last two earthquakes that rocked Oklahoma, one in 1918 and one on Aug. 19, 1933. All three quakes have had an intensity of about six. This is a non-instrumental rating indicating slight damage in poorly-built buildings, that furniture is moved, and that persons in the area become frightened and alarmed.

Earthquakes occur when the strains and stresses in the earth's crust become too great and are adjusted by sudden slips and breaks. The Oklahoma earthquake was only a slight adjustment of the crust, such as occurs somewhat more often on the east and west coasts, than in the midwest states.

This earthquake occurred when the vast underground Nemaha mountain range, extending from Nebraska to Oklahoma, shifted slightly, causing tremors recorded in Iowa, Kansas, Missouri, Nebraska, Oklahoma, and Texas.

Science News Letter, April 19, 1952



DA VINCI INVENTION—A variable speed drive meshed three cogged wheels of different diameters with the same lantern wheel to obtain different speeds of rotation in the da Vinci invention. The idea shown in this model is found today in our modern automobile.

GENERAL SCIENCE

Leonardo Da Vinci, Scientist

SCIENTISTS AS well as artists are celebrating the 500th anniversary of the birth of Leonardo da Vinci, born April 15, 1452.

Leonardo is best known for his great paintings such as Mona Lisa and The Last Supper. But he was also a creative genius in the fields of anatomy and physics as well as aviation. He was a prolific inventor.

The modern helicopter had its prototype in Leonardo's invention of an aerial screw to be operated by clockwork. This device was also the forerunner of the airplane propeller. Leonardo's "tent of linen" was the first successful parachute.

His also was the first known self-propelled vehicle, a kind of flat car driven by a spring. His device for lifting heavy weights looks remarkably like that necessary automobile tool, the jack.

Leonardo invented a projector for throwing an enlarged image of an object onto a screen. This projector, illuminated by a candle, was the prototype of the magic lantern and later the motion picture projector.

Leonardo, who was chief military engineer of Cesare Borgia, was responsible for many military inventions. They include a machine gun, aerial bombs, a steam gun, shrapnel, and a diver's apparatus. The last, Leonardo never completed because he was afraid it might be used by men working under water to damage ships.

As an artist, he was interested in the accurate portrayal of human and animal figures and this led him to a detailed study of anatomy. He was the first to show a fetus in its proper position within the uterus and the first also to show a double curvature of the spine.

He made a detailed study of the positions and movements of birds in flight and this inspired him to design a flying machine with wings like a bird's. The pilot was to lie prone in the frame and flap the wings by moving his feet in stirrups attached to a pulley system. At the same time he was to operate a windlass with his arms to guide the machine.

In spite of his many scientific discoveries, observations and inventions, Leonardo never published a book or scientific article. All we know of his scientific work has been gleaned from voluminous notebooks profusely illustrated by his own drawings. His notes were made extremely difficult to decipher because Leonardo, a lefthanded man, wrote in a reversed handwriting which could only be read by the aid of a mirror and he used many abbreviations. For over 250 years the material remained unknown. Venturi's first discussion of his notebooks was dated 1797 although Leonardo died in 1519.

Science News Letter, April 19, 1952

MEDICINE

Cow Disease Cause Of Heart Infection

► MANY PATIENTS will be saved from heart disease by an attack on brucellosis, if preliminary studies by Dr. Thomas M. Peery of George Washington University School of Medicine, Washington, D. C., prove correct.

Brucellosis is a germ disease which humans get either from working with infected cattle or from drinking unpasteurized milk from infected cows. Undulant fever and Malta fever are other names for the disease in humans. In cattle it is called Bang's disease. It causes abortion in cows.

This disease in humans leads to a chronic disease of the heart valves, calcific aortic stenosis, Dr. Peery believes on the basis of findings he reported to the American Association of Pathologists and Bacteriologists meeting in New York.

In the heart condition, the normal opening of valves is interfered with by deposits of lime salts. This obstructs the flow of blood from the heart, causing heart failure.

Diseased aortic valves, usually with deposits of lime salts in them, have been found in persons who died of brucellosis, Dr. Peery reported. And chronic disease of the aortic valve has followed brucellosis in a number of cases, he reported.

Both brucellosis and the heart condition are more common in men than in women. Brucellosis seldom occurs before the age of 30, the heart condition seldom before the age of 40, Dr. Peery pointed out.

Science News Letter, April 19, 1952

NUTRITION

Eat Wild Greens While Garden Grows

► YOUR GARDEN is planted but the first radish and carrot are not yet ready to pull and eat.

While you wait for those home grown vegetables, you might gather some wild greens that grow along the roadside and even on front lawns before the garden patch is ready. Like cultivated greens, they furnish both vitamins and minerals as well as the appetite appeal of new and often tangy flavors.

First of the wild greens to come are dandelions. Also available at this season, and in fact at all seasons, since it is an evergreen, is watercress. Check with your local health department about its safety, however, as in some localities the water it grows in might be polluted.

Besides these two greens, housewives may be able to serve, as a change from spinach and lettuce, stinging nettle, marsh marigold, dock, milkweed, chicory, wild onion, lamb's quarter, summer mustard, poke weed, sorrel and purslane or pursley.

All members of the wild carrot family should be avoided. This includes Queen Anne's lace and other related plants with

dissected, leafy foliage, having white or yellow umbrella-like flowering and possessing a strong odor when crushed. Stems and leaves of plants with woody stems should also be avoided.

Only the tender young leaves of plants should be selected for eating. By the time the plants are in flower their flavor will be too strong. The greens, like those you buy at the market, should be thoroughly washed and all imperfect parts discarded. Young crisp leaves are nice for salad, but these wild greens can also be cooked like spinach or chard and served with butter or a sauce.

Science News Letter, April 19, 1952

BIOPHYSICS

Exploding Silver Cleans Cancer from Human Brains

► RADIOACTIVE SILVER mixed with a gelatine-like foam may do a clean-up job on minute particles of cancer tumors left in the brain after a brain cancer operation.

Dr. Theodore B. Rasmussen, professor of neurosurgery at the University of Chicago, reported that this treatment is two years away, so far as human patients are concerned. He is now studying how it works in cats.

Surgeons can many times take out only nine-tenths or nineteen-twentieths of a brain tumor, he said. At present the patient must undergo four to six weeks of daily shots of X-rays in order to clean up the part of the tumor not reached by the knife. With the new treatment, the silver-gelfoam mixture is put into the brain at the time of the operation.

The radioactive silver would shoot beta particles into the remaining cancer cells. It would lose its radioactivity after seven days. The gelfoam is absorbed by the body in about three weeks. Thus the radioactive silver would not reach other parts of the body.

Gelfoam is a synthetic substance now used to stop bleeding during a brain operation.

Science News Letter, April 19, 1952

MEDICINE

Cortisone Saves Little Girls From Fate of Bearded Lady

► CORTISONE, FAMOUS arthritis remedy, is now helping little girls escape a bearded lady fate and is keeping little boys from becoming big boys prematurely.

The children, 17 of them so far, were doomed to abnormal sexual development because they were born with a defect that led to overgrowth of their adrenal glands. Success in helping every one of the 17 was obtained by treatment with cortisone, which is an adrenal gland hormone. The patients were treated by Dr. Lawson Wilkins at Johns Hopkins Hospital and Medical School, Baltimore.

Science News Letter, April 19, 1952

IN SCIENCE

MEDICINE

Anti-Vitamin C Aids X-ray Cancer Treatment

► A NEW kind of anti-vitamin treatment, this time anti-vitamin C, may be a useful aid to X-ray treatment of patients with cancer, leukemia and Hodgkin's disease.

Studies pointing toward this were reported by Dr. Theodore Miller of the Pack Medical Group, New York, and Drs. Boris Sokoloff and Walter H. Eddy of the Southern Bio-Research Laboratory, Lakeland, Fla., at the meeting of the American Association for Cancer Research in New York.

The hope from their studies is that patients kept on a diet low in vitamin C might be successfully treated with lower doses of X-rays or might be able to take larger and therefore more effectively cancer-killing doses of the X-rays.

In rats the method has been successful. Cancers in the animals were completely destroyed by an X-ray dose that would not otherwise have been effective when the animals were on a vitamin C-less diet.

The method has so far been tried on nine human patients. In four patients with advanced cancer, there were no apparent results. But in cases of liposarcoma and Hodgkin's disease, the response to X-ray treatment "appeared to be more satisfactory than expected," the doctors reported.

Science News Letter, April 19, 1952

BIOPHYSICS

Powerful Radiation Source Could Kill in Four Seconds

► A MAN would die within four seconds if he were directly exposed to the 5,000 curies of cobalt 60 being installed for experimental use at the Stanford Research Institute's new Radiation Engineering Laboratory. Such radiation is so powerfully penetrating that it would be partly duplicated only by about \$100,000,000 worth of radium and it is stronger than a million-volt X-ray machine.

Intended to develop industrial uses for large amounts of radiation, the new laboratory will cooperate with industry in developing practical safe systems for using atomic radiation in a large variety of ways.

The gamma ray source which is to be manufactured in the nuclear reactor at Brookhaven National Laboratory, Long Island, N. Y., will be kept in a large underground tank filled with water, and elaborate protective devices, remote control equipment, pilot plant engineering equipment, and carefully controlled conditions will safeguard this powerful source.

Science News Letter, April 19, 1952

NATURAL RESOURCES

Alberta to Aid California Supply Oil to West Coast

► SURPLUS OIL production in Alberta is to be added to California's supply to Pacific coastal states, probably around 1954, after a 700-mile pipeline from Edmonton, Alberta, to Vancouver, B.C., has been completed.

D. L. Roberts, vice-president of Canadian Bechtel, Ltd., Vancouver, reported to the American Society of Mechanical Engineers meeting in Seattle that California oil reserves even now are not considered adequate to supply Pacific coast demand. But though oil consumption west of the Rockies has outstripped California production, new discoveries in Alberta have made more oil available in that region than there are existing markets.

The trans-mountain pipeline will deliver 75,000 barrels a day to Vancouver. If four more pumping stations are added, the pipeline capacity can be raised to 200,000 barrels a day, Mr. Roberts said.

"According to the Petroleum Administration for Defense, there is not enough oil production in California today to meet the requirements of the armed services and civilians in the area west of the Rocky Mountains, although refining capacity is adequate if crude were available," Mr. Roberts said.

"The demand was more than 900,000 barrels a day last year and by 1960 it may reach 1,240,000 barrels a day," he added.

Science News Letter, April 19, 1952

GENERAL SCIENCE

Chuckles Mixed With Sneezes in Mine Story

► THERE WERE many chuckles about the Navy's Project Sneeze. Most research reports from the very scientific Office of Naval Research are deadly serious.

This one, which was published in the official Navy publication, *RESEARCH REVIEWS*, dated March 1952, not April 1, was played straight by several newspapers. But it was all peppery fun, the Navy's scientists admit.

Here is the official report, verbatim:

A World War II project, held under high security classification until recently, has been declassified and can now be described. This was the "gesundheit mine," developed for the Navy during the Battle of the Atlantic but never put to operational use.

It is well known that we, as well as our enemies, had proximity mines—usually acoustic or magnetic—which would detonate without actually being struck by the

ship. The chief shortcoming of these weapons was that they were non-discriminating; they were just as effective against friendly ships as those of the enemy. Project "SNEEZE" was an ingenious attempt to make the mine more choosy.

The mine was moored, set to float about 12 feet beneath the surface. When a ship approached within attack range a proximity device released the mine, allowing it to rise to the surface. A small projectile launcher, mounted on the top of the mine and trained by magnetic attraction of the ship, would then fire a canister missile onto the deck of the ship. The canister was loaded with red pepper.

A sensitive microphone pickup on the mine did the rest. If a crew member on the ship said "Gesundheit" the mine would explode; if he merely said "God Bless You" the mine would remain unarmed.

Science News Letter, April 19, 1952

NATURAL RESOURCES

Synthetic Natural Gas May Relieve Fuel Problem

► BECAUSE OF an increasing shortage of natural gas with respect to the number of heaters, stoves and furnaces consuming it, the day soon may come when bituminous and anthracite coal, and even such low-grade coal as lignite, will have to be burned at the mines, converted to methane and piped hundreds of miles across the country to consumers.

That prediction was made by C. R. Breck of the Southern Natural Gas Co. He said experiments conducted jointly by his company and the U. S. Bureau of Mines convinced him it would be practical to make synthetic "natural" gas by the German Lurgi process.

The Lurgi process uses a nickel catalyst to act upon gases given off by burning coal. The catalyst converts the gases to methane, a principal component of natural gas.

Science News Letter, April 19, 1952

INVENTION

Entire Game Scored By Bowling Machine Totalizer

► A SCORING device for bowling alleys which totalizes and scores the results of one or more players from the beginning to the end of each game has been awarded patent number 2,590,444.

Invented by Jacob Millman of Flushing, N. Y., and Howard P. Stabler of Williamsburg, Mass., the machine can keep track of the scores of persons bowling individually or as team members, and whether each player is bowling on one or two alleys during the game. The machine has been assigned to the American Machine and Foundry Co., of New Jersey.

Science News Letter, April 19, 1952

ANIMAL NUTRITION

Feed for Chickens Simplified by Tests

► CHICKEN FARMERS are feeding their flocks "a lot of junk they don't need." Especially two amino acids previously thought to be vital parts of chicken feed have been proven to be useless.

Dr. J. A. Stekol, Lankenau Hospital Research Institute and the Institute for Cancer Research in Philadelphia, told SCIENCE SERVICE that he had made probably the first systematic study of the amino acid requirements of chickens. Amino acids are the basic building blocks of proteins, necessary to all life. New and cheaper chicken feed may come out of his study.

He fed 78 chickens every day for five weeks on amino acid combinations to discover which they needed to build proteins and which they could do without. This cost \$2.00 per day per chicken, or more than \$5,000.

He found that the chicken manufactures its own choline and that methionine can also be eliminated from the diet. Next on his program is to analyze the need for all other amino acids and then to compare the actual need with the amino acids that are found in present day commercial feed.

What holds true for chickens is also probably true for other animals and for humans, Dr. Stekol said. His studies were made in connection with finding out how different food components affect the growth of cancer cells.

Science News Letter, April 19, 1952

CHEMISTRY

Blue Cheese Flavor Without the Cheese

► BLUE CHEESE flavor without the blue cheese is what some scientists foresee.

They have tracked down the flavor of blue cheese, taken it out of the cheese and put it into a salad oil. They have also made the flavor synthetically. Either of these products eliminates the poor appearance, whether as a spread or in salad dressing, of blue cheese itself.

To get the oil product, well-ripened blue cheese is melted down in a hot water bath and then extracted with a vegetable oil like that used on salads. This oil, after being clarified, is suitable for immediate use, or it may be mixed with vinegar, salt and other ingredients to get a Roquefort-like salad dressing.

Methyl n-amyl ketone is used with a fatty acid, such as butyric acid, and a salad dressing base to get the man-made blue cheese flavor. Research work aimed at getting blue cheese flavor without the cheese was done at the Pennsylvania State College School of Agriculture's experiment station in State College, Pa.

Science News Letter, April 19, 1952

ASTRONOMY

Three Giant Eyes

New 120-inch telescope on Mount Hamilton will be completed within a few years. This will give California the world's three largest telescopes.

See Front Cover

By MARTHA G. MORROW

► THREE GIANT eyes will be scanning the heavens from California mountain tops within a year or two. The 200-inch telescope high on Mount Palomar and the 100-inch atop nearby Mount Wilson are already hard at work. A new 120-inch telescope, second largest in the world, is now being created on Mount Hamilton. It will be housed in the building shown in the foreground on the cover of this week's SCIENCE NEWS LETTER.

When the third big eye goes to work, Californians can boast of the three largest telescopes in the world. And well they might brag, for the state of California is footing the bills for the 120-inch telescope. This is the first large telescope ever authorized by a state legislature.

A giant's house has just been completed for the telescope. The room in which the instrument will be kept is 94 feet high and 97 feet across. Almost 4,000 sacks of cement were used in laying the foundations. The door is so wide trucks can be driven right into the room. A 45-cubic-foot refrigerator has been installed for storing plates to be used in photographing the heavens.

These three giant eyes of California, all mirror or reflecting telescopes, will work as a team, reports Dr. C. D. Shane, director of the University of California's Lick Observatory on Mount Hamilton. There will be no duplication of observations. Each will have its own specific task, but the observing program of one telescope will be coordinated with that of the other two. Sometimes two together will try to solve one problem.

Predict Operation in 1954

The new 120-inch telescope will join an already-illustrious family of instruments at Lick Observatory. The 36-inch refracting or lens telescope, once the world's best, for over a half century has claimed distinction as the second largest of its type in the world. Here one also finds a camera with a 20-inch lens designed specially for photographing the heavens, and other keen-eyed telescopes.

The 120-inch telescope is far from finished. It probably will not go into operation until about 1954. But the gigantic mirror blank, critical part of the new instrument, is already in the new building.

The glass blank, ten feet across, was recently installed in the basement grinding

pit of the new observatory building. Soon rough parts will be worn away to produce a perfect parabolic curve.

From the grinding pit extends a tunnel 11 feet high, 11 feet wide and 73 feet long. This was dug so that after grinding, the ribbed disk can be tested right there in the building to be sure that light which strikes it when stood on its edge is focused to a pinpoint.

The four-ton mirror blank was a lucky find. It did not have to be created at great expense. It had already been cast back in 1933, and was gathering dust in a Pasadena basement. The pyrex disk was sold to Lick Observatory at its original cost.

The lens was originally made for the California Institute of Technology, to be used in testing the 200-inch mirror put into operation just four years ago. But another method of testing was used on the Giant of Palomar, so its smaller stepsister had never been polished. Now this bargain-basement lens has become a telescopic Cinderella.

Originally Lick Observatory astronomers planned to use a conventional solid-back mirror for the telescope. But inquiries showed that it would be difficult to have a suitable glass made in the United States. About this time Palomar's 200-inch mirror with its ribbed back was proven an un-

questionable success. So the planners switched to this lighter, more-available type. In purchasing the 120-inch test mirror, they sped up completion of the telescope by about two years and cut in half the overall weight of the mirror.

The grinding machinery for the mirror, 16 inches thick, also was bought from the California Institute of Technology. The know-how for putting the lens into shape is being supplied by Don Hendrix of Mount Wilson and Palomar Observatories of the Carnegie Institution of Washington and the California Institute of Technology.

Astronomers working with the new instrument will ride high above the mirror. A cage at the tip-top of the telescope tube, 50 feet above the lens, will carry the observer and necessary equipment. Here at the prime focus photographs can be taken.

To cut off as little light as possible, this cage will be elliptical instead of circular. Only about 11% of the light which otherwise would fall on the mirror will be intercepted by the elliptical cage, 48 inches by 32 inches across. This 120-inch telescope and the 200-inch one are the only telescopes in the world built to carry an astronomer in the tube.

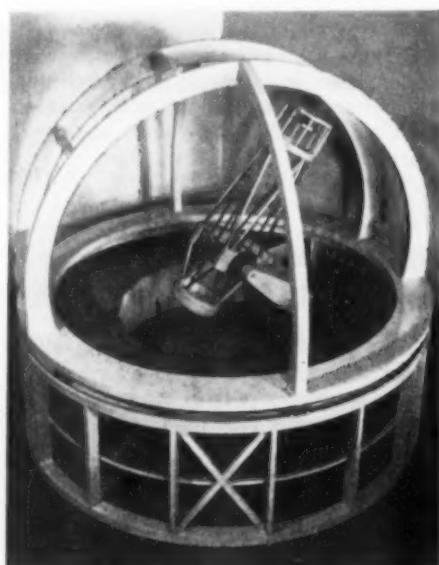
First Fork-Type Support

For the first time, a long fork-type support will be used on a large telescope. This two-pronged, 70-ton steel fork can be motor-driven at will around its polar axis. A second motor will drive the 35-ton tube holding the mirror at its lower end. The whole sky, except a band close to the horizon, can be studied with the telescope.

The hollow fork will have an overall length of 23 feet, eight feet longer than is needed for the telescope lens and tube. This extra length is provided so that a Cassegrain spectrograph, which fans out the light of a star or nebula into its rainbow colors, can be located directly beneath the large mirror. This arrangement saves the light that otherwise would be lost by another reflection.

Total cost of the telescope and its housing will run somewhere around \$1,800,000. This is about double the amount estimated a decade ago when the project was first approved by the California Legislature. But lessons learned in constructing the two giant eyes of California and other large reflectors are helping University of California astronomers keep the cost to a minimum despite ever-rising prices.

A tiny model of the telescope, one-sixteenth its actual size, was built some years ago by the designer, W. W. Baustien. With this he sought in a miniature observatory to solve in advance the problems which would be encountered in the telescope's



TELESCOPE MODEL—How the 120-inch telescope and its dome are expected to look upon completion is shown in this photograph of a model.

operation. Many improvements have been devised since this first model was made.

To keep the telescope as cool during the daytime as at night, the steel dome will be insulated with aluminum-foil. A relatively light main shutter 22 feet wide will travel up and over the dome. When stars high in the sky are being studied, the partially-closed shutter will serve as a windscreen.

In the new building the lens can be tested both in flat and upright positions without being taken out of the grinding room. A section of the floor above the grinding machine can easily be removed and a knife-edge test stand mounted on the crane carriage 89 feet above the mirror, still safe in the grinding pit. This arrangement plus the light tunnel will cut to a minimum the time spent in testing the lens.

"The design of the telescope is really quite conservative," states Dr. Shane. "It was kept this way so that almost any type of auxiliary equipment usable on large telescopes could be installed when needed."

The new telescope will take astronomers 5,500 billion billion miles out into space. It will make visible faint stars and cities of stars beyond the reach of all but the Palomar giant. Although it will not be in operation for a few years, astronomers are planning how to use its time to best advantage.

When the moon is new and the night sky visible in all its glory, the motion and rotation of star systems far out in space will be studied by Dr. Nicholas U. Mayall and other astronomers of Lick Observatory. When the full moon makes the sky too bright, Lick's Dr. George Herbig and Dr. Otto Struve of the Leuschner Observatory in Berkeley will have a chance to study the dispersed light of stars in order to determine their structure and chemical makeup.

Lick astronomers Drs. Gerald Kron and Olin J. Eggen are looking forward to attaching their photoelectric equipment to the new telescope to determine more exactly light changes in certain faint stars and nebulae. Dr. Shane expects to search for far-away systems of millions of stars and estimate their number in sample sky regions.

Whatever time is left from these studies also will be well spent. This new giant eye, like its astronomical brothers, will work hard to extend man's knowledge of the vast universe of which our earth is a tiny part.

Science News Letter, April 19, 1952

THE THEORY AND CONSTRUCTION OF A SELF-CHARGING VAN DE GRAAFF GENERATOR

By Richard H. Waters

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ANIMAL NUTRITION

Chickens Make Protein

Radioactive sulfur injected into chickens shows up in egg as cystine, proving that poultry can convert inorganic sulfur to a protein.

► CHICKENS can make one of their own proteins from inorganic sulfur, a feat previously believed possible only for green plants and microorganisms. It is the first time that an animal has been known to make a protein from inorganic sulfur.

The protein the chickens make is cystine. And the fact that they can build this protein may mean cheaper feed bills for the farmer, although further experiments are needed to find out exactly how much cystine is made by the chicken.

Discovery of the protein-building process was described by L. J. Machlin of the U. S. Department of Agriculture, Beltsville, Md. He reported to the American Institute of Nutrition meeting in New York that radioactive sulfur was used to show that chickens can make their own cystine. Dr. H. R. Bird, Dr. P. B. Pearson and C. A. Denton were co-workers in the experiments.

The scientists injected very dilute sulfuric acid containing radioactive sulfur into the hens. When they tested the eggs laid by these hens, radioactive sulfur was found.

Proteins are made up of amino acids, nature's building blocks, of which there are about 20. Two of these, methionine and cystine, contain sulfur and are found in nearly all proteins.

Green plants and microorganisms make methionine and cystine using inorganic sulfur such as sulfuric acid and its salts, but this process was supposed to be impossible for animals. They were believed to get all of their sulfur-containing amino acids by eating plants or by eating the meat of other animals that ate plants.

To find out exactly what was the form of the radioactive sulfur, the proteins were broken down into amino acids and the sulfur-containing cystine and methionine separated by paper chromatography.

"When the paper strip having methionine was brought close to a Geiger counter," Dr. Bird told SCIENCE SERVICE, "there was only the usual number of background clicks. When, however, the paper strip containing cystine was tested, the counter sounded like a corn popper."

Thus they showed that the hens were able to use inorganic sulfate to make cystine but not methionine. The chickens have to depend on their diet for pre-formed methionine.

Now the poultry specialists would like to find out just how much cystine is made by chickens, Dr. Bird stated. The radioactive detecting method is so sensitive that

only very small amounts of cystine may be involved. He also pointed out that the chickens on which these experiments were performed were already getting adequate amounts of both cystine and methionine in their standard diets, so would not need to make it for themselves at all, although they did anyway. It would be interesting, he said, to test chickens not fed cystine for then there might be some biological incentive to make the protein.

But the fact that the hen can make cystine at all is of great importance, because the United States has never had enough protein to feed its livestock population for most efficient production of meat, milk and eggs.

Science News Letter, April 19, 1952

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MEDICINE

Color Test on Blood Detects Disease of Liver

► A BLOOD test that may prove helpful in detecting liver disease, including cancer that has spread to the liver, was announced by Drs. David W. Molander, Max M. Friedman and John S. LaDue of the Pack Medical Group, New York, at the meeting of the American Association for Cancer Research in New York.

The test is a colorimetric method for determining the level of a body chemical, cholinesterase, in the blood serum. Low levels of this chemical are found in patients with widespread cancer that has spread to the liver and in patients with lymphoma that has spread to the liver. When these lymphoma patients improve under treatment, the cholinesterase in the blood serum, as shown by the test, progresses toward a normal level.

Useless operations can sometimes be prevented by the information given from this test, the doctors reported. They also stated it should be valuable in distinguishing between different possible causes of jaundice in various patients.

Science News Letter, April 19, 1952

INVENTION

Automobile Salvaging in Easy-to-Handle Packages

► A MACHINE which cuts automobile bodies into three sections so they can be baled by a conventional power-driven press has been invented by Bruce I. Hochman of Los Angeles, and awarded patent number 2,590,700.

The device consists of two pairs of rotary saws. Each set of saws has one saw mounted with its center near a conveyor belt carrying the chassis-stripped auto bodies, and the other saw suspended immediately above it.

The auto bodies are fed crosswise into the saws and are cut into three sections which can be baled by scrap-metal presses into easy-to-handle packages.

Science News Letter, April 19, 1952

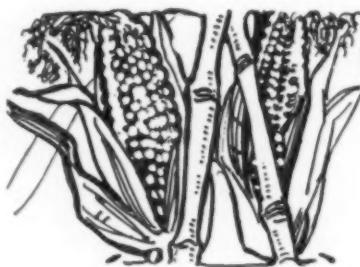
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AGRICULTURE

NATURE RAMBLINGS**Prairie and Plow**

► WHEN FARMERS first transplanted themselves from the Old World to the New, most of them came from countries that had once been forest-covered.

Land had to be won with the ax before it could be given to the plow. Unforested land was mostly moor, heath, rocky upland or swamp—all unfit for farming, though the swamplands might be reclaimed by draining.

They found essentially similar conditions in the eastern part of this country, where the first settlements were established. When a pioneer went out to win a farm from the wilderness, the first thing he had to do was "make a clearing."

The trees were cut down, and except for the logs he needed for his cabin and rail fences, they were burned to get rid of them.

MEDICINE

Birth Control in Rats

► BIRTH CONTROL by a chemical that a woman can swallow like a pill or in water is the prospect held out in studies reported by Drs. Gustav J. Martin and J. M. Beiler of the National Drug Company Research Laboratories, Philadelphia.

The chemical is phosphorylated hesperidin. It prevents conception by protecting the jelly-like covering of the egg cell. This jelly-like covering is normally dispersed by the enzyme, hyaluronidase, which accompanies the sperm cell from the male. The action of hyaluronidase enables the sperm to penetrate the jelly-like covering of the egg cell.

The hesperidin compound which counters hyaluronidase has so far been studied in rats. In these agents it "was found to be an effective antifertility agent," Drs. Martin and Beiler state in their report to fellow scientists through the journal *SCIENCE* (April 11).

Potash, leached out of the ashes, was used mainly in soapmaking, though some of it might be traded for such "store goods" as gunpowder, calico, salt and ironware. Then the stumps were pulled or blown out, and finally the land could be plowed and planted.

Not until the generation after the Revolution, when the first great wave of migration broke into the West, did settlers encounter extensive natural grasslands. There were "prairie islands" in the forest cover of Ohio, and when the settlers got to northern Illinois they found a continuous sea of tall grass, with timber belts confined mostly to the banks of rivers.

At first they did not know what to make of it. A doctrine arose, and was widely accepted, that only soil that could grow such big things as trees was "strong" and could produce good crops; soil that grew only grass was "weak" and not fit for farming.

So for some years the farmers stuck stubbornly to the river banks and did not attempt to break the prairie sod, which was really much richer than the cut-over land they were cultivating.

There were two other, and better, reasons for the failure at first to put the grasslands under the plow. Early transportation followed the rivers a good deal, going either by boat or along roads that stuck to the easy water-level grades.

The other reason was the unsuitability of the early part-wooden or cast-iron plows for the tough task of ripping through the matted cordlike roots of the prairie grasses. But about a hundred years ago steel plows began to be built—big ones, too, drawn by six or eight span of oxen. They made possible the conquest of the long-grass prairies, which are now the world's most productive corn lands.

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In a group of rats that got the chemical by mouth, six out of 30 became pregnant and had successful deliveries. In a group that got it by injections, or "shots", into the belly, four out of 24 delivered. About 80% of these same rats became pregnant when they were remated after the hesperidin treatment was stopped.

As a further check on the effectiveness of the chemical, the scientists set the experiments up with two females and one male in each cage. One of the females got the phosphorylated hesperidin treatment. The second did not. Unless this untreated rat became pregnant, showing that the male was fertile, the treated female was not counted in evaluating the results of the chemical.

The phosphorylated hesperidin had no effect when given to the males.

Although the scientists call the results "striking," they consider them preliminary.

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CHEMISTRY

Cortisone by Fermentation

Microbiological oxygenations of sterols by molds of the order that includes bread molds accomplish difficult shift of oxygen atom.

► **LARGE-SCALE PRODUCTION** of cortisone from abundantly available starting materials is promised by a fermentation process devised by a research team of the Upjohn Company, Kalamazoo, Mich.

A mold of the type commonly associated with stale bread is used.

Cortisone, a hormone which has been found effective in treating rheumatoid arthritis and a wide variety of other diseases, is now made from a cattle bile component called desoxycholic acid by what is probably the most intricate series of chemical steps used in any commercial process.

Originally, it took 37 separate steps to make the drug, and the bile acid from 40 head of cattle was needed to provide enough cortisone to treat a single patient for one day. Great improvements have been made in the process, but desoxycholic acid is still the starting material and about 20 steps are still required.

Up to now "the most difficult series of steps" in the partial synthesis of cortisone has involved the shifting, by adroit chemical methods, of an atom of oxygen from one position, technically known as the C-12 position, to another, C-11, in the complex molecule of desoxycholic acid.

Dr. D. H. Peterson, biochemist, and Dr. H. C. Murray, microbiologist, report that they have succeeded in inserting an oxygen atom in the crucial 11 position in another hormone—progesterone—in a single step, providing an intermediate compound which can then be converted into cortisone. (JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, April.)

Progesterone can be made synthetically from vegetable and animal sources, and thus is far more plentiful than desoxycholic acid. Furthermore, Drs. Peterson and Murray say that the Upjohn process can be applied to a variety of abundantly available starting materials of the class known as sterols. Thus, their work apparently has opened the way to a simpler and cheaper production of cortisone. They also have introduced into the cortisone field the fermentation process, which is used in making penicillin and other antibiotic drugs.

The molds used are species of the genus *Rhizopus*, which in turn is a member of the family *Mucoraceae*. This family belongs to the order known as *Mucorales*, which order includes the bread molds. The researchers place the progesterone in a "soup" which they describe as a "lactalbumin digest-dextrose-cornsteep medium" and add the mold, allowing the mixture to ferment for a period of 24 to 48 hours.

From progesterone a new 11-oxygenated steroid intermediate is made available for conversion to the cortical hormones. Similar microbiological oxygenations at carbon 11 using molds of the *Mucorales* order have been achieved on other steroid substrates, including androstanedione, 11-desoxy-17-hydroxycorticosterone (substance S) and 11-desoxycorticosterone.

Each of these substances can be prepared from vegetable sources such as stigmasterol, which comes from soya beans, or from animal sources, such as cholesterol.

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CHEMISTRY

Undiagnosed Cancers

► **THERE IS** probably evidence of many as yet unsuspected cases of lung and stomach cancers in the X-ray photo files of every hospital and doctor in the land.

This was discovered when Dr. Leo G. Rigler, X-ray expert at the University of Minnesota, Minneapolis, searched back over earlier X-rays of cancer patients which had been taken for entirely different reasons. In almost every case where the earlier X-ray picture existed he was able to find that the beginning of the cancer was evident long before the patient began to feel the symptoms of the disease.

Dr. Rigler advised that everyone who can should hold on to his old X-ray pictures. He said that one important factor is to be able to compare X-rays taken at different times. By comparison, changes which point to cancer but which might not otherwise be brought out can be seen.

Now Dr. Rigler is going to take X-ray photos every six months of a group of 10,000 apparently healthy men over age 50. In this group a few are destined to get cancer. He hopes to catch the cancer with his X-ray before it would normally be discovered.

Dr. Rigler knows of one case where an early X-ray taken for another reason revealed that the patient had a small tumor nine years before he died of the disease.

In cases that can be operated on, his study showed that the tumor would be evident on X-ray photos on an average 17 months before the patient complained of symptoms and went to his doctor.

He pointed out that as a by-product of the tuberculosis chest X-ray campaign some lung cancers have been picked up at early stages. However, he would not recommend

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Mr. Charles D. Harris, manager, engineering, International Harvester Refrigeration Division, Dr. Robert S. Taylor, chemical engineer, Servel, Inc., and Mr. Edward R. Wolpert, manager, engineering and research, Seeger Refrigeration Co., discuss "Report on Refrigeration."

INVENTION

Dentist Can Now Drill From Sitting Position

► **NOW THE** dentist can sit down to his work. Robert J. Haley, Longmeadow, Mass., has received patent number 2,589,803 for inventing a suspended work seat for dentists. The seat moves on an overhead trolley and is in the form of a saddle. It can be adjusted to go back and forth across a room.

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mass stomach X-rays, first because it would be too expensive and second because there are not enough people in the country with the training required to be able to spot the cancers when they appear on the X-ray photo.

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ASTRONOMY

Spot 1952's Second Comet

► THE SECOND comet of 1952, a periodic wanderer that returns about every five years, has been spotted.

Known as the Grigg-Skjellerup Comet, the object, in mid-April, was located in Aquarius, the water carrier. Much too faint to be seen without a good-sized telescope, it is moving away from the earth and will continue to grow fainter.

The comet was spotted on March 25 by J. A. Bruwer of the Union Observatory, Johannesburg, South Africa. News of the find was cabled to Harvard Observatory, clearing house for astronomical information in the western hemisphere in Cambridge, Mass., by Mlle. J. M. Vinter-Hansen of Copenhagen.

The history of this comet well illustrates how international the skies are. It was first located by a New Zealand astronomer named Grigg in 1902, then was lost until May 6, 1922, when J. F. Skjellerup, a Finnish astronomer, found it again, so that now both names are attached to it.

On its next return, it was located first by

Dr. E. Delporte of the Belgian Royal Observatory. In 1932, it was spotted by Dr. George Van Biesbroeck of the Yerkes Observatory, Williams Bay, Wis. Other countries entering the comet's history have included Sweden, Denmark, Japan and England.

Comets are spotted on photographic plates by comparing two photographs made some hours apart so that the motion of the comet shows up. Stars move also, but they are so distant that years are required before their motion becomes evident. After three separate observations of a comet are obtained, its exact path can be calculated.

For a regularly returning comet, astronomers calculate ahead of its arrival where it is expected to be. Comet Grigg-Skjellerup was at the right place about on schedule, its predicted position on April 8 being right ascension 21 hours 10 minutes and declination south four degrees. When spotted on March 25, its position was right ascension 20 hours 30 minutes and declination south 12 degrees.

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PSYCHOLOGY

Rate Big League Players

► GUS ZERNIAL of the Philadelphia Athletics would be considered the American League's leading swatter in spite of his .268 batting average. He would, that is, if formulas for evaluating baseball players developed by Robert B. Reynolds of the University of Iowa, Iowa City, were adopted by club officials.

Monte Irvin would head the batters of the National League.

Mr. Reynolds bases his formulas on a statistical study of just what kinds of player performance contribute most to a club's standing. He calculated how closely each of the indexes of performance was related to club standing over a period of six years in both leagues.

Runs batted in, he found, do a lot more toward putting a club in the first division than do the number of hits per time at bat. The best measure of pitching performance he found to be the earned run average, that is, the number of earned runs (of the opposing team) multiplied by nine and divided by the number of innings pitched. By this measure, the National League would be led by rookie player of the Boston Braves, Chet Nichols, while Saul Rogovin of the Chicago White Sox would rate as best pitcher of the American League. The earned run average, the statistics showed, is a much better index to the value of a pitcher than games won or lost.

The contention of baseball men that good pitchers are the most important asset of a

club was refuted by Mr. Reynolds' statistics. Batting and pitching carry about the same weight in determining club standing. Fielding and stolen bases, on the other hand, contribute little or nothing.

Mr. Reynolds, who is a graduate assistant in social sciences at the State University of Iowa, has an amateur interest in baseball. The formulas he has worked out will aid club officials, he believes, in deciding whether to draft or purchase likely prospects, whether to trade off players and what to do about holdouts. They cannot be used blindly, however, he warns. They serve to supplement expert opinion, not replace it.

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VETERINARY MEDICINE

New Disease, "Soremuzzle," Attacks Sheep in Texas

► SHEEP IN west Texas are being attacked by a new disease called "soremuzzle." The death rate ranges from 10% to 30%, the American Veterinary Medical Association reports in Chicago.

Cause of the disease, which the association calls "baffling," is not known. Typical symptoms are rapid weight loss, inflammation of the muzzle, and tendency to lameness, depression and scouring. The disease is not the same as the condition called sore-mouth, although the two look alike. Sore-mouth, also called contagious ecthyma, can

be prevented by vaccination, but no method of preventing soremuzzle has yet been found. No outbreaks of soremuzzle have been reported outside of west Texas. Some authorities say it is very like a disease called blue tongue which attacks sheep in South Africa.

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MEDICINE

Spleen Extract Readied To Save Atomic Victims

► ATOMIC BOMB victims of the future stand a good chance of being saved from lethal radiation effects with a blood-forming substance extracted from the spleens or other blood-forming parts of animals.

Good progress toward refining that substance from animal spleen has been made at the University of Chicago's Goldblatt Memorial Hospital by Dr. Leon O. Jacobson, professor of medicine. He will also be associate director of the Argonne Memorial Hospital when it opens in September.

Dr. Jacobson found that if he extracted the spleen from a mouse, kept it still functioning and attached to the body and shielded it, the mouse could take more than double the amount of the usual lethal dose of radiation and still live. Radiation—either from an A-bomb or from X-ray machines used in treatment of cancer—destroys the blood-forming properties of the body.

Dr. Jacobson proved that it was the blood-forming properties of the spleen which, protected by shielding from radiation, immediately began producing new blood in the mice. He ground up spleens and then injected them into mice that had been radiated with more than the usual lethal dose. Blood immediately began being produced.

The substance in the spleen or other blood-forming tissues which produces blood must be refined out, Dr. Jacobson said, before it can be used on humans, because other parts of the spleen can produce dangerous reactions in the patient.

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❶ **LAWN SPRINKLER** of the rotary type has vinyl plastic flower-pot assembly which fits on the end of a garden hose. A spike stuck into the ground holds the bright-colored device in place. Water squirting from a whirling artificial flower in the pot will sprinkle an area adjustable up to 40 feet in diameter.

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❷ **CHILD'S UMBRELLA** is made of a colorful plaid fabric with a transparent plastic handle. Rudolph the red-nosed reindeer moves in the hollow, liquid-filled handle. When the umbrella is held upright, Rudolph comes into view; when the umbrella is pointed downward, he disappears into the handle.

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❸ **SPRAY GUN**, operating on the perfume-atomizer principle, is attachable to a garden hose. It mixes a liquid or wettable-powdered insecticide into the water stream and squirts the solution through a long nozzle which can be manipulated easily to reach those hard-to-spray places.

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❹ **TELESCOPIC RIFLE** sight which will not fog internally under bad weather conditions has been developed. Based on principles worked out for military optical instruments, the telescopic sight is waterproof and works as well in cold, rainy weather as on sunny days.

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❺ **SCHOOL DESK** tops look like new when renovated with a rugged stainproof, glareproof, washable plastic having a simulated wood-grain finish. The manufacturer treats old battle-scarred tops at his plant and returns them to the sender ready to thwart destructive students.

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Do You Know?

Salamanders occur in greatest abundance in the Appalachian highlands.

One-quarter of the earth's inhabitants live in south and southeast Asia.

Yeast may some day prove a valuable source of food since it can convert simple nitrogenous compounds into valuable proteins with amazing speed.



❻ **MINIATURE BRACES** for doll provide necessary exercise for hand, arm and shoulder muscles of a seven-year-old girl stricken with polio. The girl and her doll are shown in the photograph. By taking off the doll's braces, putting them back on and adjusting them, the little girl has fun while strengthening her muscles.

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❼ **ROTARY HOE** pulls weeds out of back-yard gardens while mulching and aerating the soil at the same time. Based on the same principle used in big tractor-drawn cultivators, the active parts of this hand tool are made of a heavy-gauge steel bolted to a handle.

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❽ **ELECTRIC WRIST** watch uses a tiny storage cell which can drive a miniature motor over a year before going bad. Because of the even power delivery to the motor, the watch is said to keep time more accurately than conventional spring-wound watches.

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